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Today, you don't have to pay \$20,000 to \$100,000 for a computer. The microprocessor has revolutionized the computer industry. Now, with our system costing about \$5,000 you can compute payrolls, enter orders, keep tax records, store inventories, track payables and receivables, and chart sales. With optional typewriter, you can even store letters and other documents, and reproduce them in letter quality. In short the 8813 performs an endless number of functions at a substantial cost savings. And the 8813 pays for itself over and over in increased productivity.

Our computer on your desk can take a load off your mind. System 8813 makes data instantly available to you. The time you normally spend researching and computing can now be spent thinking and planning.

You don't have to know how to operate a computer to operate our computer. System 8813 can be easily operated by inexperienced personnel. No training is required. (It's as simple as inserting a disc and pushing a button.)

It's adaptable to exactly fit your needs. With some computers you have to fit your needs to the system. With the 8813, existing computer programs can easily be adapted to fit your requirements. And your system can include: a printer for permanent record keeping; a typewriter that produces letter quality sheets; high speed tape drives for additional data storage; and other peripherals that your needs may require.

A complete system. The 8813 comes complete with: an advanced disc operating system supporting a powerful **BASIC**; an advanced text editing system; expandable computer memory; capability of interfacing with printer or other input/output devices.

Our people know their wares. The 21st Century Shop staff totals more than 30 years of experience with all types of computers. We can tailor entire systems to meet your needs. And we're just a few minutes away if there's a question.

**System 8813
by PolyMorphic Systems.
Our computer could be just
right for your small business.
Come in and size it up for yourself.
At the 21st Century Shop.**

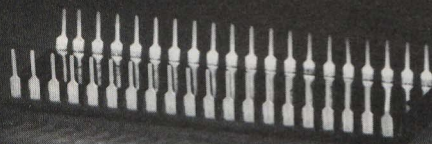


On the Skywalk between Vine and Race
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Wednesday—Saturday 10 a.m.—6 p.m., Thursday till 9 p.m.
Other hours by appointment.

Computers for Business, Science, Industry, Personal Use.

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**a small business
can now own
a computer
for
\$5000.00***

* Depends on choice of peripherals and software development.



P.O. Box 1621 Cincinnati, Ohio 45201 Office Phone: 513/651-2111

August 1, 1979

Rob Bohn, Jr.
1006 Wayne
N. Manchester, IN. 46962

Dear Mr. Bohn:

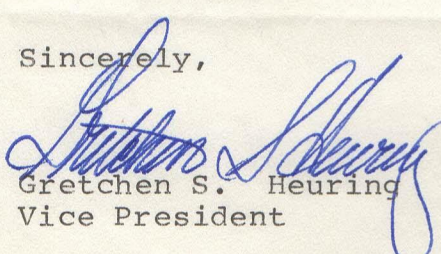
PolyMorphic Systems has passed on your inquiry to us as your closest dealer.

21st Century Shop is located in downtown Cincinnati on the Skywalk between Vine and Race. We have a sales room where the PolyMorphic System 8813 is on display and we have a fully equipped service department. The shop is open from 10:00 AM to 5:30 PM Monday through Saturday.

We can provide you with leasing and other financing programs and we maintain a bank of highly qualified software consultants to assist you with your programming needs.

At the 21st Century Shop, you will find professionals to serve you. Our staff is made up of both computer professionals and people with business experience. When you come to us, you and your needs will be taken seriously. The 21st Century Shop. We're there first.

Sincerely,



Gretchen S. Heuring
Vice President

GSH/bs

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SOFTWARE INCLUDES:

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POLY MORPHIC SYSTEMS

PRICE SCHEDULE

APPLICATION SOFTWARE:

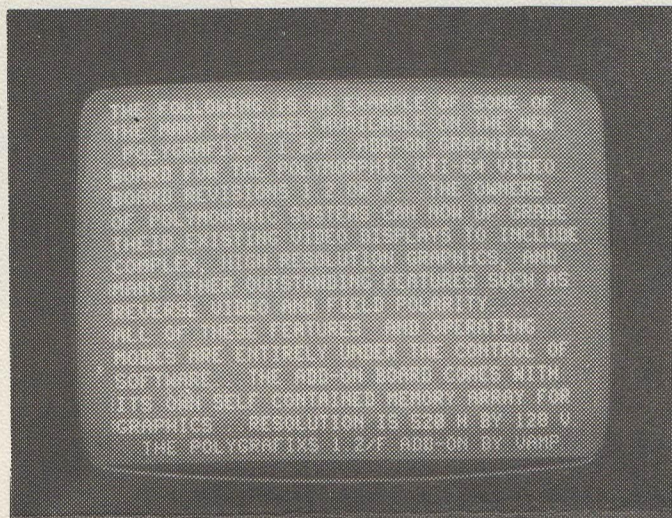
Confidence Package	000511	62.50
Accounts Receivable	000518	312.50
Loans & Investments	000519	31.25
WordMaster	000520	243.75
PLAN	000514	243.75
Mailist	000513	118.75
Inventory Control	000533	243.75
Universal Plotter	000516	31.25
Payroll System		625.00
Accounts Receivable (B)		625.00
Accounts Payable		625.00
Inventory Control (B)		312.50
Shoe Inventory Control		312.50
General Ledger		625.00
Surveyors Package		625.00
Direct Mail (Letter Writer)		62.50
Phone # Retrieval		43.75
PolyMorphic Programmers Utilities		62.50

DISK SYSTEMS:

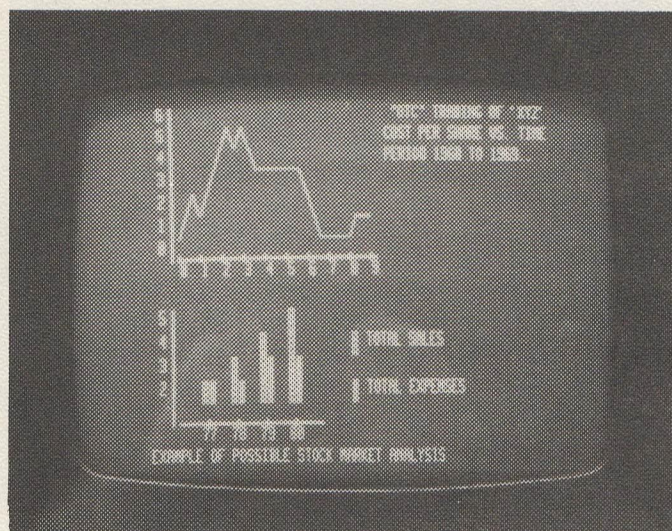
3 dr, 32k	000506	5440.00
3 dr, 16k	000300	4965.00
2 dr, 32k	000507	4850.00
2 dr, 16k	000320	4375.00
1 dr, 16k	000340	3785.00
88/MS single sided	000517	3995.00
88/MS double sided	000510	4650.00
0 dr 8813,32k,sgl s, 88/MS	000524	7300.00
0 dr 8813,32k,dbl s, 88/MS	000526	7950.00

Effective January 1, 1979

POLYGRAFIX.

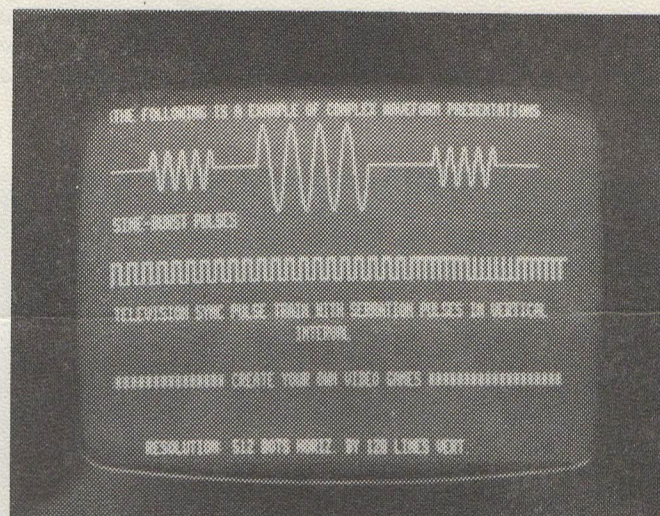


•Animation • Games • Stock Market Trends•

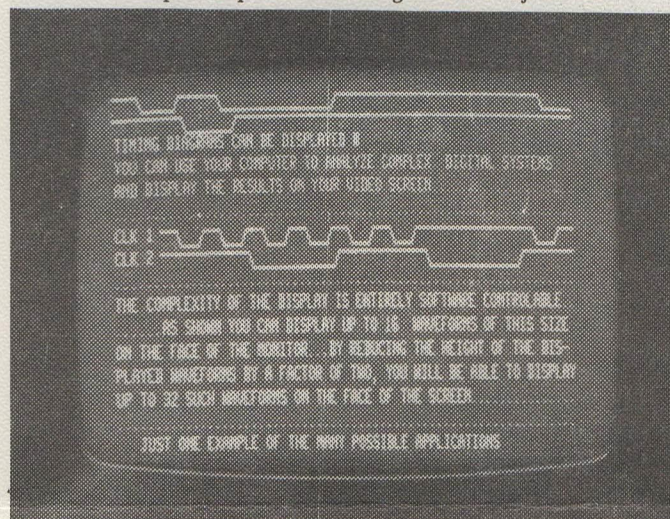


- GRAPHICS RESOLUTION: 512 Horiz. by 128 Vert.
- GRAPHICS MEMORY SUPPLIED
- COMPATIBLE WITH POLY 4.0 MONITOR
- COMPLETE SOFTWARE CONTROL
- REVERSE FIELD
- REVERSE VIDEO
- PIGGY BACK BOARD MOUNTS EASILY
- APPROVED FOR USE ON ANY SYSTEM USING POLY VIDEO CARD

A COMPLETELY SELF-CONTAINED
HIGH DENSITY GRAPHICS SYSTEM



•Complex Equation Plotting • 3-D Projections•



•Circuit Responses • Circuit Layouts • Fine Line Drawings•

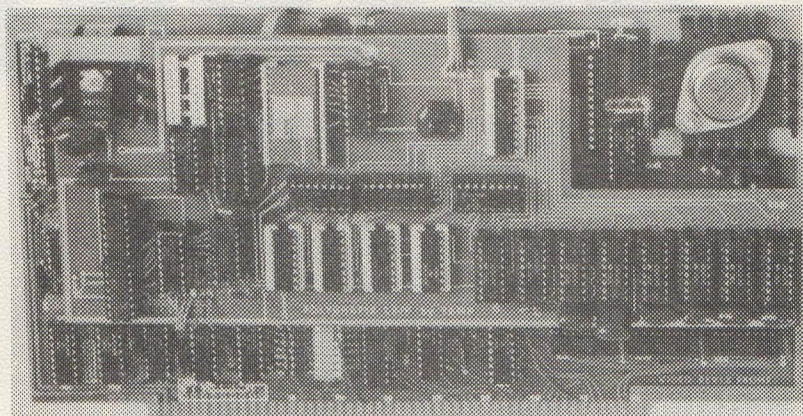
POLYGRAFIX - 1.2	Assembled & Tested	\$235.00
POLYGRAFIX - F/H	Assembled & Tested	\$245.00

NOTE: Please specify Revision Code found on the lower right of your Polymorphic Systems Video Board. It will read either 1.2 or F/H.
SHIPPING AND HANDLING ADD \$4 (Foreign orders \$8) California residents add 6% Sales Tax.

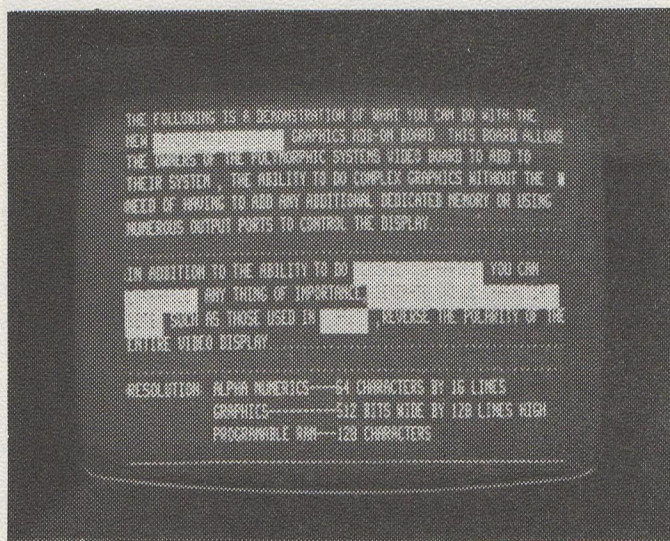
VAMP Inc.
P.O. Box 29315
Los Angeles, California 90029

Polygrafix[®]

VAMP's **POLYGRAFIX** is an add-on board which allows the owner of a Poly Video Interface board to upgrade and expand his system. It mounts easily on any Poly video card (1.2, F or H revisions) and it is compatible with all Polymorphic systems. The **POLYGRAFIX** allows the user to mix graphics and the standard character set simultaneously. Complex arrays and character fields now become a snap. The complexity of the display is entirely software controllable. Your imagination and ingenuity are your only limits.



(Polygrafix Mounted on Poly Video Card)



The **POLYGRAFIX** provides you with a contiguous graphics display. There are no breaks in the trace. At last, you can generate and display curves that actually look like curves.

The **POLYGRAFIX** allows you to generate your own character sets, such as those used in 'APL'. Up to 128 unique symbols can be stored in the character RAM at any time.

The **POLYGRAFIX** makes the highlighting of key phrases and/or equations a snap, by allowing you to reverse video and/or field polarity. Just think of the hundreds of display possibilities.

The **POLYGRAFIX** comes with on-board graphics memory. A unique graphics memory arrangement is used to optimize memory utilization. The **POLYGRAFIX** is a self-contained unit and does not require additional system memory, nor does it tie up the CPU and S-100 Buss during the display mode.

*A complete **POLYGRAFIX** system may be used with other S-100 based micro-computer systems.*

Whether your interests lie in the business, engineering or research fields, VAMP's **POLYGRAFIX** board can supply you with the flexibility in a video display that you have been looking for. It is a truly remarkable graphics system.

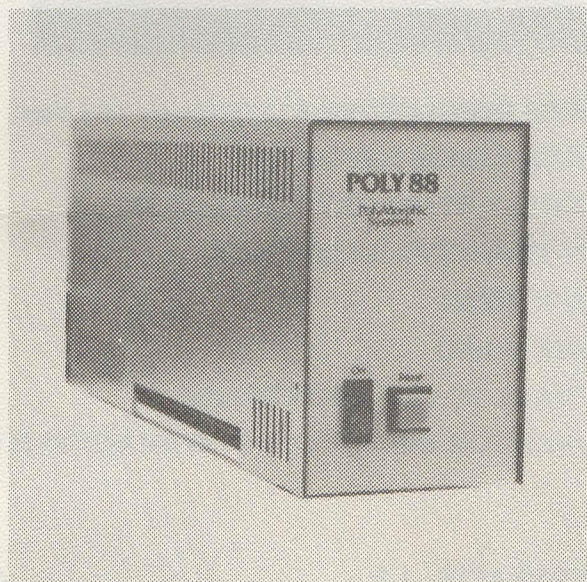
SOFTWARE

The **POLYGRAFIX** is supplied with a source listing, software package which enables you to run the board through its various modes. Additional higher level software is also available. Write for more information.

Modified Poly Basic (July 79) \$25.00

MOUNTING OPTION (Complete System)

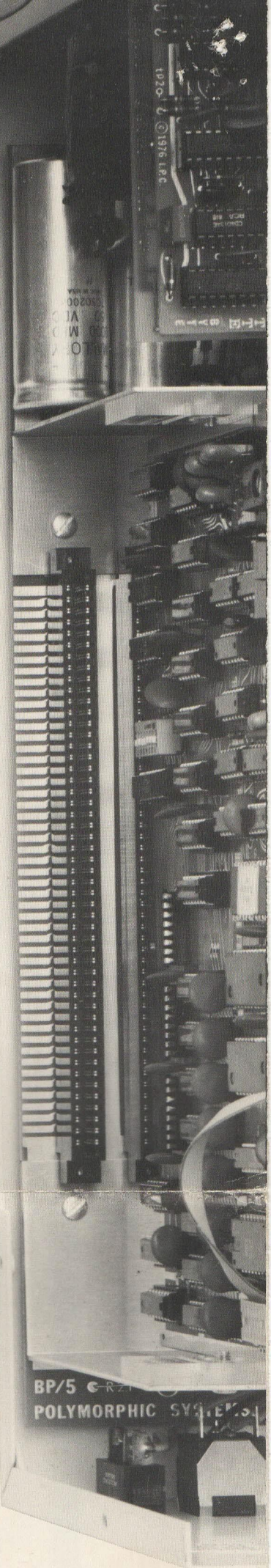
For those Poly users and/or Non-Poly users, who may wish to obtain a complete graphics system, VAMP will mount the **POLYGRAFIX** board on the Poly video card at no extra cost to you when both are purchased simultaneously from us.



Poly Video Card & POLYGRAFIX-F/H	Assem., Mounted & Tested.	\$525.00
Poly Video Card only	Assembled & Tested	\$280.00

All prices are subject to change without prior notice.

*POLY—Trademark of Polymorphic Systems, an Interactive Systems Corp.



The Poly 88 Microcomputer System

The POLY 88 Microcomputer System brings to the user, in one compact package, the capability of developing programs and hardware as well as enjoying the interaction with computers. The POLY 88 System uses a video monitor for display, a keyboard for input, and cassette tape for storage. The system will connect to a hard-copy terminal. POLY 88 hardware consists of CPU circuit card with on-board memory and I/O, video display circuit card with keyboard input port and graphics capability, and mini-cards that connect to the CPU board via ribbon cable for cassette or serial interface.

Central Processor Card

It contains the 8080A central processor, 512 bytes of RAM (random access memory), plus sockets for up to 3K of 2708-type PROM or ROM (read only memory), vectored interrupt, and real time clock, as well as a serial input-output port featuring software-controlled baud rate that lets you selectively read from and write into two I/O devices at different speeds. The serial port is designed to operate with the cassette or RS-232 current loop mini-cards.

Video Terminal Interface Circuit Card

The Video Terminal Interface circuit card generates 16 lines of 32 or 64 characters (depending on option) on a standard video monitor or slightly modified TV set. Characters are stored in a 1/2 or 1K RAM on the video board. Display capability includes graphics and text. Text includes all keyboard characters including upper and lower case, in a clear, highly readable 7 x 9 dot matrix font. Graphics characters are made up of a 2 x 3 grid in each character position, allowing for display of a 48 by up to 128 contiguous grid on a TV screen. The entire screen may be updated in 20 msec. The Video Terminal Interface circuit card also includes an 8 bit parallel keyboard input port, allowing the board to function as the complete computer interface.

Byte Standard Cassette Mini-card

The cassette interface is designed to work with the POLY 88 firmware monitor allowing simple keyboard commands to control reading and writing. This card interfaces the PolyMorphic Central Processor Card to almost any cassette recorder at 300 baud. Better recorders can communicate at 600 baud.

Serial Interface Mini-cards

This card shifts the TTL levels available from the POLY 88 central processor card to either RS-232 or current loop levels, and are optically isolated for very high common mode voltage rejection (500V). The current loop mode can be configured for 20 ma or 60 ma loops with open loop voltages up to 24 volts.

Chassis, Backplane and Power Supply

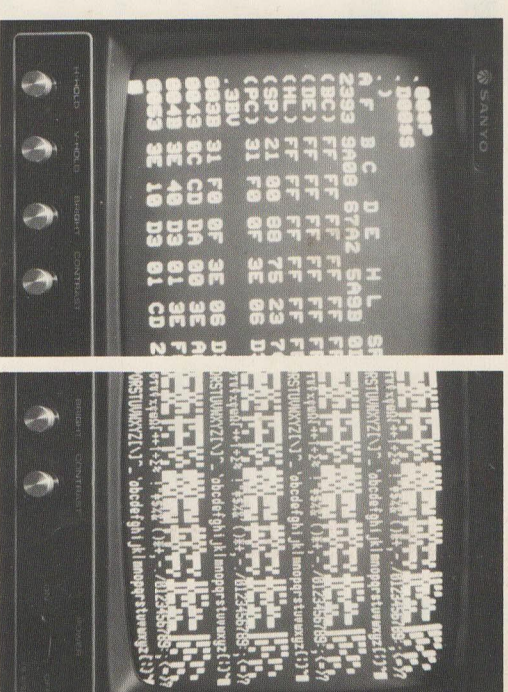
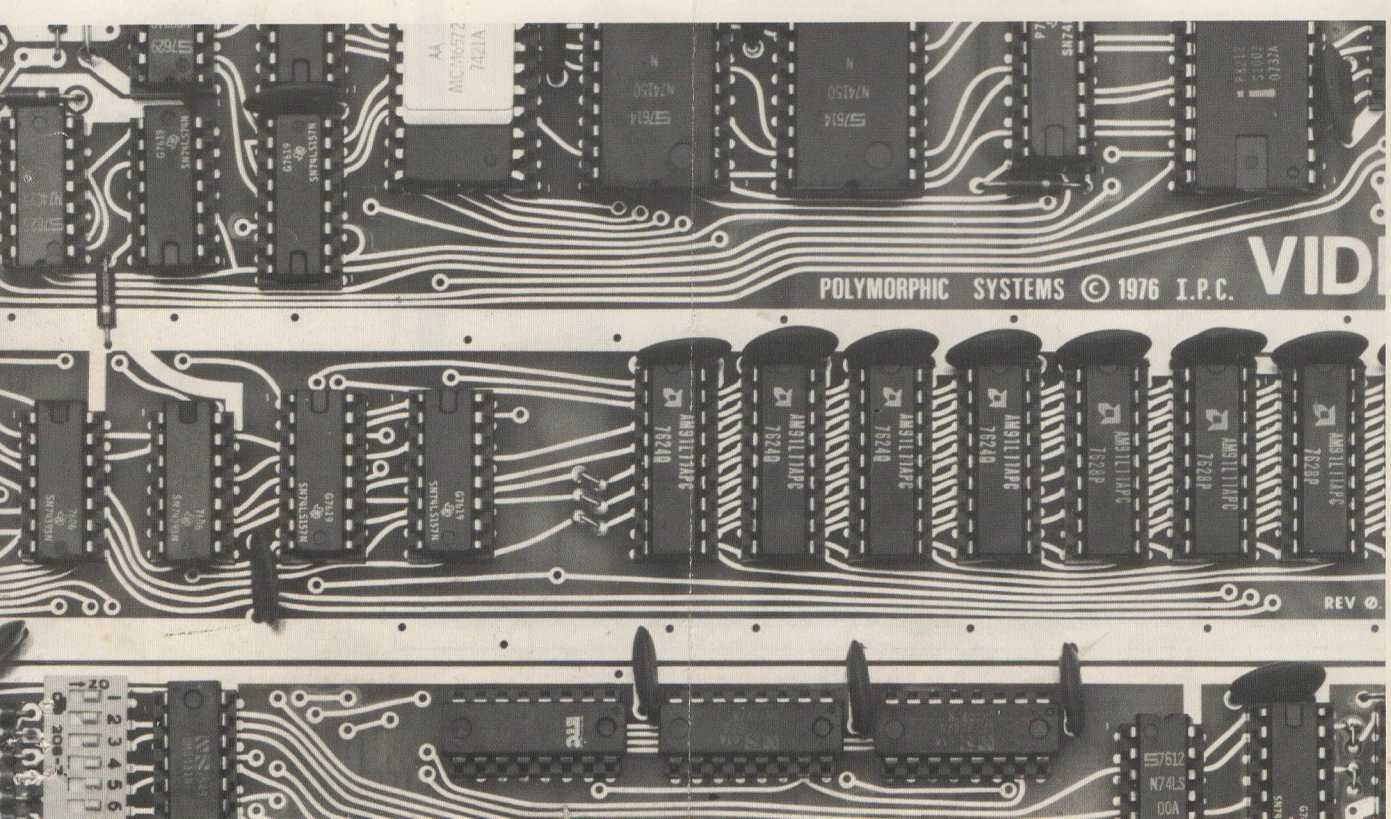
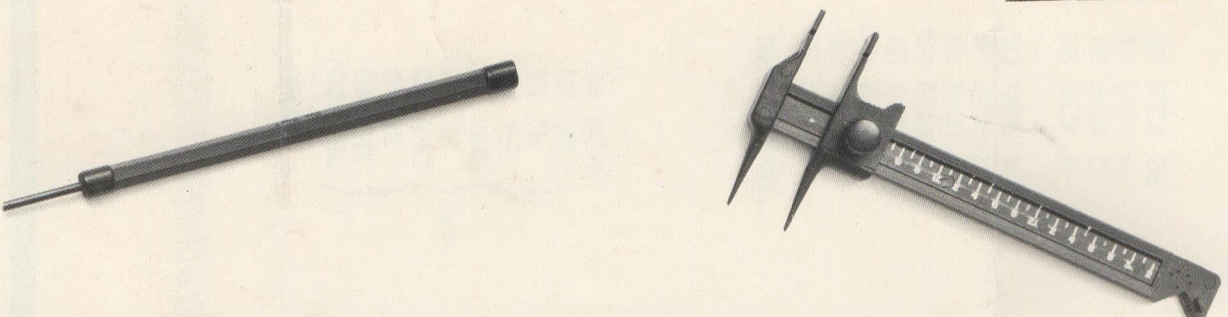
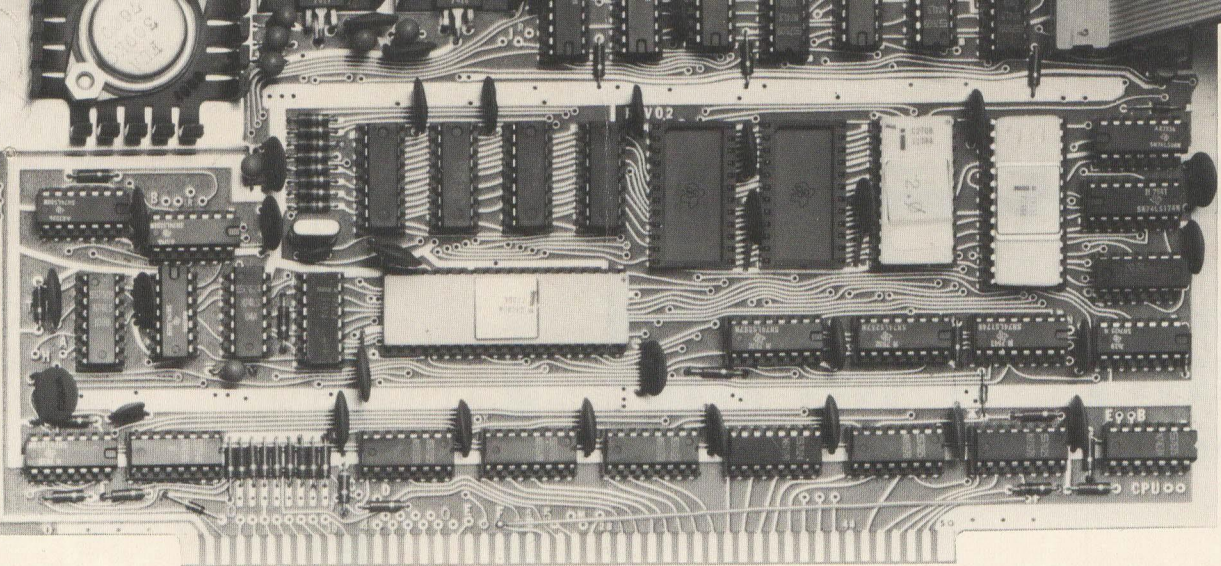
The POLY 88 chassis and backplane/motherboard was designed to support the POLY 88 computer system. It's fully Altair-compatible, and will provide 6 amps of power to five cards. Cards are rigidly supported on both sides so they can't touch each other and short out. The power supply is integral with the backplane, eliminating extra wiring. The fuse is accessible from the outside. An optional edge connector on the side lets you debug boards without an extender or mate to another chassis for system expansion. Only two switches are mounted on the front panel—a lighted on/off switch, and a push-button, which, in addition to resetting the system, indicates a halt condition in the processor.

Firmware Monitor

Integral to the POLY 88 System is the firmware monitor. This 1024 byte program in ROM allows the user to display data on a TV screen, enter data into memory using a keyboard, read and dump data to the cassette interface in a standard format, and single step through a program while displaying the contents of each of the 8080's internal registers. The single step hardware on the CPU circuit card forms the basis for a powerful debugging aid.

The monitor provides many of the standard driving routines to greatly simplify the job of programming. This monitor forms the basis of an ever-increasing software library available to POLY 88 owners. A tape made on one POLY 88 can be run on another with little or no modification.

Options from PolyMorphic Systems include a board with 8K of additional RAM, a versatile prototyping board ("the Ideaboard"), and an Analog Interface. Also, many "Altair compatible" products on the market are compatible with this system.



Altair, Imsai, Polymorphic Compatible Products

Additional circuit cards available for the POLY 88. These cards are also plug-compatible with the Altair and IMSAI microcomputers.

8K RAM - \$300

Additional memory may be added to the POLY 88 by including an 8,192 byte RAM static memory card. The card features full buffering on all address and data lines, DIP switch selectable address, and provision for battery backup so that data stored in the memory is not lost when power is off.

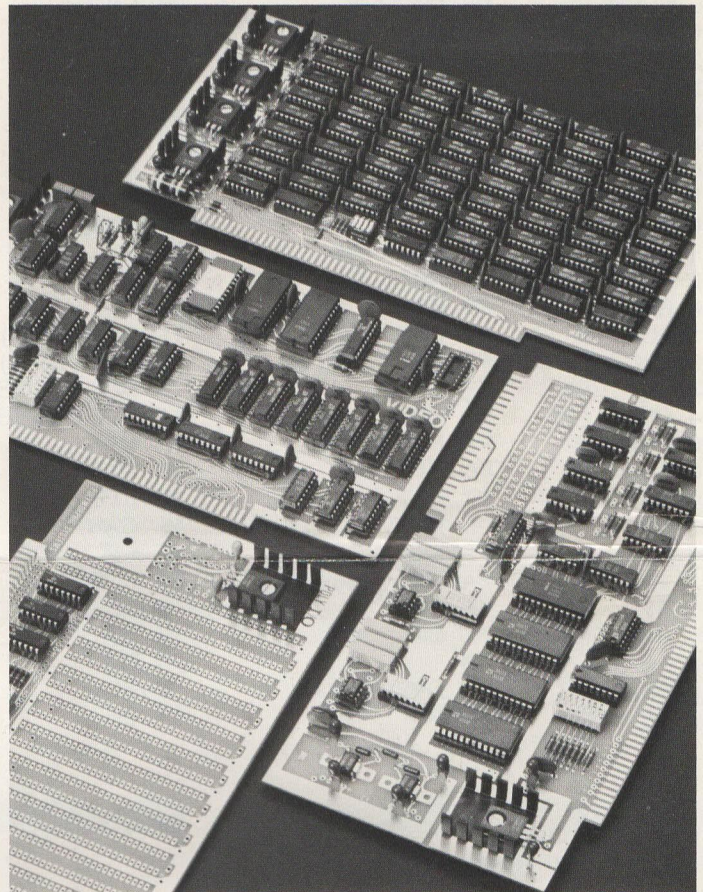
I/O Prototyping Idea Board

The POLY 88 I/O Ideaboard allows a custom circuit to be built without devoting time to the items common to all circuits. Address decoding provides eight strobe lines for four input and four output ports. Strobed buffers interface to data bus. A jumper option allows memory-mapping output ports into the last 1/4K of memory space. A DIP switch makes address or port selection easy. The Ideaboard also includes a 5V regulator and printed traces for adding more positive and negative voltages. Generous bypassing is provided. Wire-wrap terminals are provided for bus lines and other important connections. Hole rows are drilled on three-tenth centers for maximum flexibility in placing chips on the Ideaboard. With this board, designing hardware can be as creative as designing software for the POLY 88.

Analog Interface

The Analog Interface allows the POLY 88 or another compatible microcomputer to control and sense analog devices. The POLY Analog interface consists of two or four output ports, depending on option, which provide latched digital inputs to one or two monolithic 10-bit-digital-to-analog converters. The analog output of these converters drives high-speed op-amps to produce a voltage varying over a range of 10V. On the input side, the eight analog comparators can be used for level-sensing, null detection, and analog-to-digital conversion by means of comparison with the analog output.

The POLY Analog board will generate high-resolution graphics on a CRT or plotter, monitor the environment in your home, run a telescope drive, synthesize music, run a radio-controlled model — almost any application requiring analog/digital conversion.



Video Terminal Interface

For those who do not have a POLY 88 or want to add an additional communication device, the Video Terminal Interface card is available separately. A video display offers a fast and inexpensive way to communicate with a computer. The PolyMorphic System's video display is even faster than most video terminals, as the characters being displayed are actually part of the memory of the computer. The display may be updated as fast as the computer can write into memory, which is typically many times faster than a terminal operating at even 9600 baud. This allows for software controlled functions such as scrolling (even split screen scrolling is easily implemented) and cursor manipulations.

Data can be displayed as 16 lines of 32 or 64 characters. The 128 ASCII character set includes upper and lower case letters, numbers, punctuation, and control characters. Each character is formed from an easy-to-read, 7 x 9 dot matrix.

Data can also be displayed graphically. The graphics capability divides each character location into six cells, each individually "light" or "dark." With the POLY VTI, you can create 48 x 128 plots, graphs, etc., and run game programs.

The VTI includes standard software, allowing scroll and page modes, insert/delete, and full cursor control. It also includes game programming. Literature covers kit-building, testing, trouble-shooting, and software.

The PolyMorphic POLY VTI is the only "Altair-compatible" video terminal interface with keyboard input port and full graphics.



PolyMorphic
Systems

Functional Listing

Numerical Listing

C1 POP B	E1 POP H	01 SOH	21 !	41 A	61 a
C2 JNZ Adr	E2 JPO Adr	02 STX	22 "	42 B	62 b
C3 JMP Adr	E3 XTHL	03 ETX	23 #	43 C	63 d
C4 CNZ Adr	E4 CPO Adr	04 EOT	24 \$	44 D	64 d
C5 PUSH B	E5 PUSH H	05 ENQ	25 %	45 E	65 e
C6 ADI D8	E6 ANI D8	06 ACK	26 &	46 F	66 f
C7 RST 0	E7 RST 4	*07 BEL *	27 '	47 G	67 g
C8 RZ	E8 RPE	08 BS	28 (	48 H	68 h
C9 RET Adr	E9 PCHL	09 HT	29)	49 I	69 i
CA JZ	EA JPE Adr	*0A LF *	2A *	4A J	6A j
CB ---	EB XCHG	0B VT	2B +	4B K	6B k
CC CZ Adr	EC CPE Adr	0C FF	2C ,	4C L	6C l
CD CALL Adr	ED ---	*0D CR *	2D -	4D M	6D m
CE ACI D8	EE XRI D8	0E SO	2E .	4E N	6E n
CF RST 1	EF RST 5	0F SI	2F /	4F O	6F o
D0 RNC	F0 RP	10 DLE	30 0	50 P	70 p
D1 POP D	F1 POP PSW	11 DC1 (X-ON)	31 1	51 Q	71 q
D2 JNC Adr	F2 JP Adr	12 DC2 (TAPE)	32 2	52 R	72 r
D3 OUT D8	F3 DI	13 DC3 (X-OFF)	33 3	53 S	73 s
D4 CNC Adr	F4 CP Adr	14 DC4 (TAPE)	34 4	54 T	74 t
D5 PUSH D	F5 PUSH PSW	15 NAK	35 5	55 U	75 u
D6 SUI D8	F6 ORI D8	16 SYN	36 6	56 V	76 v
D7 RST 2	F7 RST 6	17 ETB	37 7	57 W	77 w
D8 RC	F8 RM	18 CAN	38 8	58 X	78 x
D9 ---	F9 SPHL	19 EM	39 9	59 Y	79 y
DA JC Adr	FA JM Adr	1A SUB	3A :	5A Z	7A z
DB IN D8	FB EI	1B ESC	3B ;	5B [	7B {
DC CC Adr	FC CM Adr	1C FS	3C <	5C \	7C
DD ---	FD ---	1D GS	3D =	5D]	7D } (Alt Mode)
DE SBI D8	FE CPI D8	1E RS	3E >	5E ^ (1)	7E ~
DF RST 3	FF RST 7	1F US	3F ?	5F _ (←)	7F DEL (Rub Out)

ical/arithmetic expression that evaluates
quantity.
ected

* = all Flags (C, Z, S, P, AC) affected
** = all Flags except CARRY affected;
(exception: INX & DCX affect no Flags)

morphic
ems

Makers of microcomputer systems and peripherals.

00	NOP		20	---	40	MOV B,B	60	MOV H,B	80	ADD B	A0	ANA C
01	LXI B,D16	21	LXI H,D16	41	MOV B,C	61	MOV H,C	81	ADD C	A1	ANA C	
02	STAX B	22	SHLD Adr	42	MOV B,D	62	MOV H,D	82	ADD D	A2	ANA C	
03	INX B	23	INX H	43	MOV B,E	63	MOV H,E	83	ADD E	A3	ANA C	
04	INR B	24	INR H	44	MOV B,H	64	MOV H,H	84	ADD H	A4	ANA C	
05	DCR B	25	DCR H	45	MOV B,L	65	MOV H,L	85	ADD L	A5	ANA C	
06	MVI B,D8	26	MVI H,D8	46	MOV B,M	66	MOV H,M	86	ADD M	A6	ANA C	
07	RLC	27	DAA	47	MOV B,A	67	MOV H,A	87	ADD A	A7	ANA C	
08	---	28	---	48	MOV C,B	68	MOV L,B	88	ADC B	A8	XRA C	
09	DAD B	29	DAD H	49	MOV C,C	69	MOV L,C	89	ADC C	A9	XRA C	
0A	LDAX B	2A	LHLD Adr	4A	MOV C,D	6A	MOV L,D	8A	ADC D	AA	XRA C	
0B	DCX B	2B	DCX H	4B	MOV C,E	6B	MOV L,E	8B	ADC E	AB	XRA C	
0C	INR C	2C	INR L	4C	MOV C,H	6C	MOV L,H	8C	ADC H	AC	XRA C	
0D	DCR C	2D	DCR L	4D	MOV C,L	6D	MOV L,L	8D	ADC L	AD	XRA C	
0E	MVI C,D8	2E	MVI L,D8	4E	MOV C,M	6E	MOV L,M	8E	ADC M	AE	XRA C	
0F	RRC	2F	CMA	4F	MOV C,A	6F	MOV L,A	8F	ADC A	AF	XRA C	
10	---	30	---	50	MOV D,B	70	MOV M,B	90	SUB B	B0	ORA C	
11	LXI D,D16	31	LXI SP, D16	51	MOV D,C	71	MOV M,C	91	SUB C	B1	ORA C	
12	STAX D	32	STA Adr	52	MOV D,D	72	MOV M,D	92	SUB D	B2	ORA C	
13	INX D	33	INX SP	53	MOV D,E	73	MOV M,E	93	SUB E	B3	ORA C	
14	INR D	34	INR M	54	MOV D,H	74	MOV M,H	94	SUB H	B4	ORA C	
15	DCR D	35	DCR M	55	MOV D,L	75	MOV M,L	95	SUB L	B5	ORA C	
16	MVI D,D8	36	MVI M,D8	56	MOV D,M	76	HLT	96	SUB M	B6	ORA C	
17	RAL	37	STC	57	MOV D,A	77	MOV M,A	97	SUB A	B7	ORA C	
18	---	38	---	58	MOV E,B	78	MOV A,B	98	SBB B	B8	CMP C	
19	DAD D	39	DAD SP	59	MOV E,C	79	MOV A,C	99	SBB C	B9	CMP C	
1A	LDAX D	3A	LDA Adr	5A	MOV E,D	7A	MOV A,D	9A	SBB D	BA	CMP C	
1B	DCX D	3B	DCX SP	5B	MOV E,E	7B	MOV A,E	9B	SBB E	BB	CMP C	
1C	INR E	3C	INR A	5C	MOV E,H	7C	MOV A,H	9C	SBB H	BC	CMP C	
1D	DCR E	3D	DCR A	5D	MOV E,L	7D	MOV A,L	9D	SBB L	BD	CMP C	
1E	MVI E,D8	3E	MVI A,D8	5E	MOV E,M	7E	MOV A,M	9E	SBB M	BE	CMP C	
1F	RAR	3F	CMC	5F	MOV E,A	7F	MOV A,A	9F	SBB A	BF	CMP C	

Adr = 16 bit address

D8 = constant, or logical/arithmetic expression that evaluates to an 8 bit data quantity.

D16 = constant, or logical/arithmetic expression that evaluates to a 16 bit data quantity.

† = only CARRY affected

PolyM
System

737 S. Kellogg, Goleta, Ca. 93017 (805) 967-2351

POLY 88 and System 88 Applications

We at PolyMorphic Systems design and manufacture a general purpose microcomputer system, which is easily adapted to the applications requirements of the user or OEM manufacturer.

Both PolyMorphic Systems hardware (computer equipment) and software (computer programs) have been designed to allow a full range of possible system configurations.

Since our computers are general purpose systems, most custom applications require additional software development on the part of the user or OEM manufacturer.

Our design makes it easy for you to develop a system application using one of our systems as a foundation.

The system software monitors, displays, and controls system functions. It also includes an Assembler for developing efficient and high-speed application programs, and BASIC, one of the most popular programming languages for easy, fast and powerful development of applications programs.

The PolyMorphic operating system, or monitor program as it is sometimes called, enables the user to communicate with the computer the instant the machine is turned on. Most systems require the user to "key in" (i.e. flip switches in the proper sequence) some minimal operating system before the computer will recognize keyboard entries or accept programs from mass storage devices (such as cassette or paper tape). The PolyMorphic monitor program does not require such "key in" procedures. A POLY 88 or System 8813 user can make use of the keyboard, cassette recorder and floppy disc (the latter is applicable to the POLY 8813 only) whenever the machine is "on". The operating system is permanently stored on ROM (read-only-memory integrated circuits) for immediate access.

The POLY 8813 is a true disc system, with all of the features of the POLY 88 plus five additional card slots, a much larger power supply and facilities for one, two, or three floppy disc drives. Floppy discs allow faster and more random access to data or to programs than do cassettes.

The POLY 8813 disc operating system permits greater flexibility of named files (up to 31 characters per name) and has easier access to data files. The POLY 8813 software system simplifies the program process as it extends programming power and application potential.

Possible applications for the POLY 88 or System 88 cover a broad range of interests, including: education, the home, business, finance, science, and industry. The following list covers only a part of the potential range. Those that should be handled by the disc system are marked by one asterisk (*) and categories that require some sort of custom hardware interface are marked by double asterisks (**).

Education

Programmed Learning
Developing and Correcting Tests
Computer Science Education
Doing Homework

Home

Alarm System**
Temperature Control**
Automated Light Switching**
Balancing Checkbook
Doing Income Tax
Turning on Appliances Before Waking**

Games & Amusements

Games: Mazes
Star Trek

Games & Amusements (Cont.)

Tank Attack
Gambling (Horse Race, Blackjack etc.)
Target
Guessing
Economic

Other: Animated Graphics
Robotics**

Business

Cash Flow
Payroll
Accounts Receivable*
Accounts Payable*
Taxes*
Inventory Control*
Word Processing*
Mailing List*
Document or Form Printing

Science & Engineering

Statistical Analysis
Mathematical Computation
Scientific Computation
Engineering Computation
Data Gathering and Sorting from Ext. Sensors**
Experiment Control**

Finance

Investment Return
Stock Market
Commodities
Mixed Investments (alternate strategies)
Insurance as an Investment

Finance (Cont.)

Credit Estimation from Financial Statement

Graph Plotting

Industry

Automatic Control**

Monitor Sensors**

(Pressure, Temperature, Light, etc.)

Alarm System**

Problem Solving

Inventory Distribution Control*

Assembly Line Control

Real Time Control

Miscellaneous

Software Development**

Smart Computer Terminal

Data Base System

Front End System

(For Preprocessing of Large Computer Data)

Telecommunication Processor

PolyMorphic Systems

POLY 88

PolyMorphic
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On

Reset

```
Stop in line 230
>>LIST 110,140
110 FOR A=0 TO P/N STEP P/(P/N)
120 GOSUB 1000
130 PLOT XB*(P/COS(AB+A)),YB*(SIN(AB+A)),1
140 NEXT
??
```

HITACHI

OFF POWER ON

V.HOLD

H.HOLD

BRIGHT

CONIT

Advent 2.0
The POLY 88 Microcomputer System

FILES

CONSOLE

System 8810

The System 8810 by PolyMorphic Systems is easy for both the novice who wants already-existing programs and the programmer who wants to write his own programs to use. With our system software the novice just inserts the disk and pushes the button. The application program takes over and guides you to the solution. You don't need special commands or procedures to put the system to work.

For the programmer, the 8810 gives you a wide range of tools for applications development. All the tools you need to write or modify BASIC are an integral part of the system software. Disk BASIC can: save and load programs on the disk automatically with no need to pre-allocate files; give you access to up to four files at one time; read, write, and modify records in a file not only in sequence, but also based on position in the file; talk to serial devices in BASIC; and connect your device drivers to BASIC.

For those who want to write their own programs in assembly language, we provide a disk-to-disk assembler. Assembly options allow assembly with a complete listing, a listing of errors only, or no listing, on either the video screen or a printer. The powerful debugger makes it possible for you to interrupt running programs, alter memory or register, then return to exactly where you left the interrupted program and resume running. Our versatile text editor, which gives you full screen cursor control, can help you create or edit assembly language or BASIC source files, or plain text files.

The system executive program (EXEC) gives you disk management capabilities: you may copy or delete, or type files on the video screen or on a printer. An "UNDELETE" command allows you to recover deleted files. Users also get a detailed directory: program size, and name, location, and load and start addresses allow you to get at

programs easily. Several system overlays are also provided for the programmer including error messages and diagnostics.

System 88 software is designed to be powerful, yet easy to use. This ease lets the computer novice use pre-programmed applications without training. The power of the system allows those who wish to design their own programs to also be immediately productive; you can quickly build and validate the applications you need.



PolyMorphic
Systems

Specifications

PolyMorphic Systems Disk BASIC

Scientific Functions: Sine, cosine, log, exponential, square root, random number, X to the Y power.

Read and Write Disk Files from BASIC.

Input type-ahead • Cassette Save, Load, and Verify of Named Programs • Multi-line Functions • Point-Plotting on Video Display • Real-Time Clock • String Manipulation and String Functions • Formatted Output • Memory Load and Store • 8080 Input and Output • Multiple Statements Per Line • Renumber • If Then Else • Array Dimensions Limited by Memory • Single Character Input.

Commands: RUN, LIST, SCR, CLEAR, REN, CONT, SAVE, LOAD, VERIFY, FILE, OPEN, CLOSE, REW, POS, DEF.

Statements: LET, IF THEN ELSE, FOR NEXT, GOTO, ON, EXIT, STOP, REM, READ, DATA, RESTORE, INPUT, GOSUB, RETURN, PRINT, OUT, POKE, PLOT.

Built in Functions: FREE, ABS, SGN, INT, LEN, CHR\$, VAL, STR\$, ASC, SIN, COS, RND, LOG, TIME, EXP, CALL, SQRT, PEEK, INP.

Chassis

Backplane: 5 S-100 card slots.

Disk Drives: 1 (chassis for 2 more drives available).

Firmware Debugger

Functions: Tape loader for Byte standard or Polyphase encoded Poly format absolute binary cassette files. Front panel simulator program displays register and memory on system video display. Commands allow register or memory modification, program interrupt and single step of or return to interrupted program. The debugger is completely stack re-entrant.

Disk Drives

Transfer Rate: 125,000 bits/sec.

Latency: 100 ms.

Access Time: 40 ms track to track.

Maximum Number of Drives: 3 (w/add on chassis).

Tracks/Disk: 35.

Sectors/Track: 10.

Data Bytes per Disk: 89,600.

MTBF: 8000 hours.

Hard Error Rate: less than 1 in 10^{10} bits read

Video Display

Number of Characters: 1024.

Characters per line: 64.

Character Set: 94 ASCII characters; 32 Greek characters and special symbols.

Character Font: 7 x 9 dot matrix.

Graphics Resolution: 128 horizontal; 48 vertical.

Processor Card

Processor Type: 8080A.

Clock: Crystal controlled 1.8432 MHz.

Interrupts: 8 level vectored.

Real Time Clock: 50/60 Hz.

Serial I/O Port: TTL levels for optional minicards (Printer Interface & Cassette Interface available).

Baud Rate: Software controlled 12.5 to 9600 baud (asynchronous) 800 to 57,600 baud (synchronous).

Data Format: 5, 6, 7, or 8 bits with or without parity.

Ports: Can handle up to 2 minicards.

Memory

RAM: 16,896 bytes **ROM:** 3,072 bytes

Access Time: 500 ns

Power Supplies

AC Input: 110-125VAC, 50-60 Hz, 200 W max.

+8V Supply: 6.5A

+16V Supply: 750MA

-16V Supply: 250MA

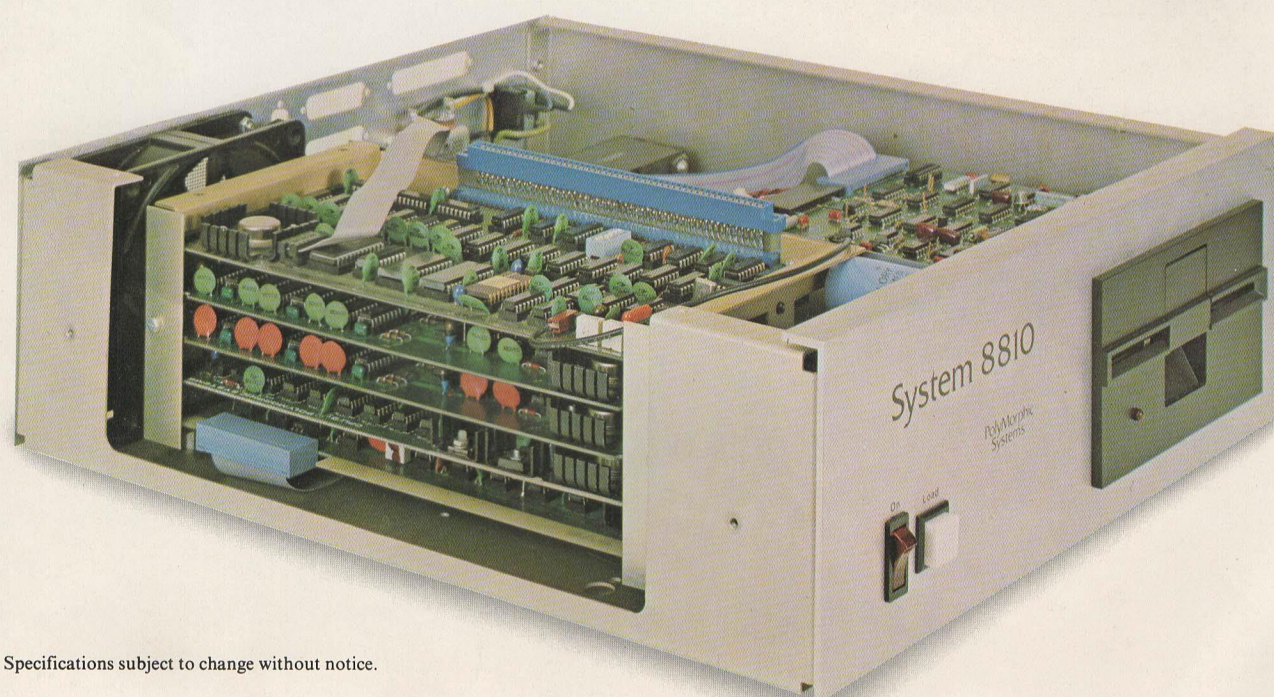
Cabinet

Material: Walnut side panels.

Dimensions: 16"W x 17¼"D x 5½"H.

**PolyMorphic
Systems**

460 Ward Drive Santa Barbara, CA 93111 (805) 967-0468



Specifications subject to change without notice.

PRINT "NO ONE ELSE USING SYSTEM NOW"

599 *** INITIALIZE SYSTEM ***

$\text{600 SET } \&\text{COM}\$ (1,28) = "0000\$ \$ \$ \$ \$ \$ \$ \$ \$ \$"$

610 ~~GO SUB 630~~ GO SUB 630

620 RETURN

699 ^{USER #} *** / ERROR ***

700 PRINT "SYSTEM ACCESS DENIED"

710 GOTO 990

929 *** INITIALIZE USER ***

6.30 If $\text{LEN}(N\#) > 7$ THEN $N\# = N\#(1,8) \cdot \text{N\#}(2,8) \cdot \text{N\#}(3,8) \cdot \text{N\#}(4,8) \cdot \text{N\#}(5,8) \cdot \text{N\#}(6,8) \cdot \text{N\#}(7,8)$ RETURN

640 $N_4 = N_4 \& "b" \setminus 60 \rightarrow 630$

1829 am Rhein

719 *** USER # IN USE ***

```
720 PRINT "USER NUMBER ALREADY IN USE"
```

730 6070 990

989 *** END ***

990 PRINT "GOODBYE"

995 SET &com#(U*8-3, U*8+4) = "kkkkkkkk"

996 $A\# = \&com\#(5, 28)$

997 IF A\$ = "246" THEN SET &COM#(1,4) = "4444"

1=3
2=12
3=21

2
10
18

```
5 PRINT CHR$(13), "CONVERSE" \ PRINT
10 PRINT "WHAT IS YOUR NAME?" N$
15 IF N$(1,1) = "B" THEN PRINT "NO LEADING SPACES!" \ GOTO 10
20 PRINT "WHAT IS YOUR USER NUMBER (RIGHT BELOW SCREEN); ", N$,
30 INPUT "? ", U \ PRINT
40 IF NOT (U=1) THEN IF NOT (U=2) THEN IF NOT (U=3) THEN 700
50 A$ = &COM$(1,1)
60 IF NOT (A$ = "0") THEN GOSUB 600 \ GOTO 90
70 A$ = &COM$(U+1, U+1)
80 IF A$ = "B" THEN 700
399 *** CHECK FOR NEW MESSAGES ***
400 *****
    ↳ U1=1 \ A$ = &COM$(U1, U1) \ IF A$ = VAL(U) THEN GOSUB 450
410 U1=2 ~~~~~~ 011to 450
420 U1=3 ~~~~~~ 011to 450
430 RETURN

449 *** PRINT MSG ***
450 PRINT "FROM", &COM$(U1*8-3, U1*8+4)
460 PRINT &COM$(U1*75-46, U1*75+28)
470 PRINT \ Q=1
480 RETURN
```


~~256 bytes~~
~~DB = 0 if system is initialized~~
~~DB User 1 "N" or "Y" is initialized~~
~~D\$ = User 1's name~~

260 ~~DB = 0~~ SET = &COM\$(U# + 1, U# + 1) = U\$
 270 SET &COM\$(U * 75 - 46, U * 75 + 28) = M\$
 280 PRINT \ ~~DB~~
 290 ~~DB~~ A\$ = &COM\$(U1, U1) \ IF A\$ = VAL(U) THEN GOSUB 400
 300 U2 = 2 \ A\$ = &COM\$(U1, U1) \ IF A\$ = VAL(U) THEN GOSUB 450
 400 } 310 U2 = 3 \ A\$ = &COM\$(U1, U1) \ IF A\$ = VAL(U) THEN GOSUB 500
 320

290 ~~DB = 0~~ T = &TIME \ Q = 0 ~~DB = 0~~ Q = 1 IF MESSAGE FOUND
 300 GOSUB 400 \ IF Q = 1 THEN GOTO 130
 310 IF &TIME < T + 100 THEN 300
 320 PRINT "WAITING FOR A RESPONSE....."
 330 GOSUB 400 \ IF Q = 1 THEN GOTO 130
 340 IF &TIME < T + 60 THEN 330
 350 PRINT "WAITED TOO LONG.."
 360 GO TO 120

MIGHT NEED TO CHECK IF (U+1 = "0")
 MSG SENT WAS RECEIVED

629 *** INITIALIZE USER ***

630 IF LEN(N\$) < 7 THEN ~~640~~ N\$ = N\$ & "6" \ GOTO 630

~~640 N\$ = N\$ & "6" & GOTO 630~~

650 SET BCOM\$(U*8-3, U*8-3) = N\$

660 RETURN



The Computer for the Professional

Whether you are a manager, scientist, educator, lawyer, accountant or medical professional, the System 8813 will make you more productive in your profession. It can keep track of your receivables, project future sales, evaluate investment opportunities, or collect data in the laboratory.

Use the System 8813 to develop reports, analyze and store lists and schedules, or to teach others about computers. It is easily used by novices and experts alike.

Reliable hardware and sophisticated software make this system a useful tool. Several software packages are included with the machine: an advanced disk operating system supporting a powerful BASIC language interpreter, easy to use text editor, assembler and other system utilities. Prices for complete systems start at \$3250.

See it at your local computer store or contact us at 460 Ward Dr., Santa Barbara, CA 93111, (805) 967-0468.

PolyMorphic
Systems

System 8813

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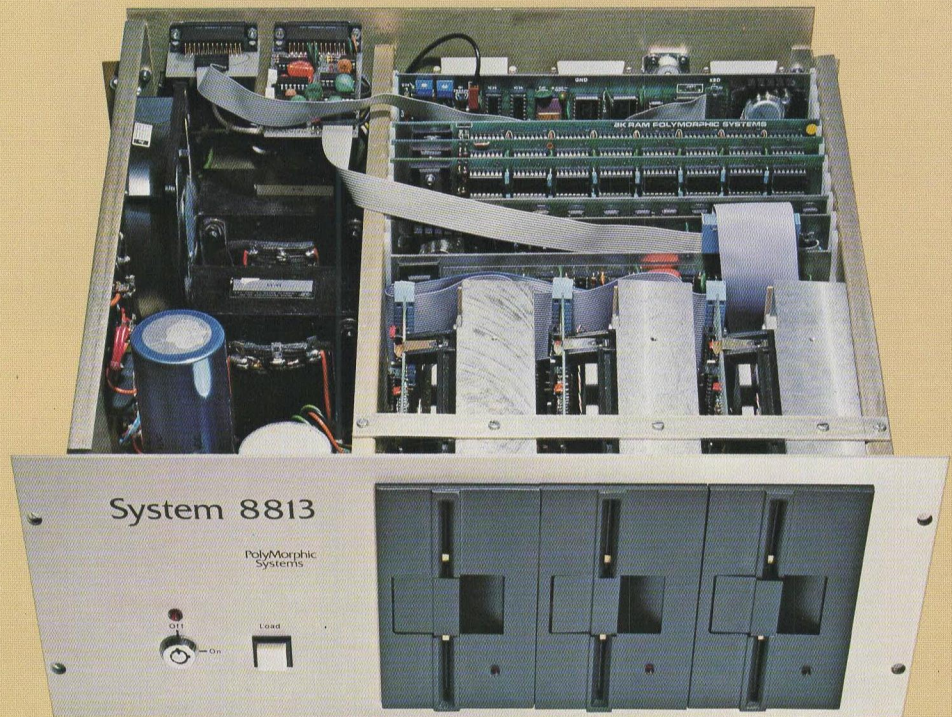
For those who want to write their own programs in assembly language, we provide a disk-to-disk assembler. Assembly options allow assembly with a complete listing, a listing of errors only, or no listing, on either the video screen or a printer. The powerful debugger makes it possible for you to interrupt running programs, alter memory or register, then return to exactly where you left the interrupted program and resume running. Our versatile text editor, which gives you full screen cursor control, can help you create or edit assembly language or BASIC source files, or plain text files.

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copy, delete, or type files on the video screen or on a printer. An "UNDELETE" command allows you to recover deleted files, and the "IMAGE" command allows you to copy an entire disk onto another. Users also get a detailed directory: program size, and name, location, and load and start addresses allow you to get at programs easily. Several system overlays are also provided for the programmer,

including error messages and diagnostics.

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PolyMorphic Systems 11K BASIC

Size: 11K bytes.

Scientific Functions: Sine, cosine, log, exponential, square root, random number, x to the y power.

Read and Write Disk Files from BASIC.

Input type-ahead • Cassette Save, Load, and Verify of Named Programs • Multi-line Functions • Point-Plotting on Video Display • Real-Time Clock • String Manipulation and String Functions • Formatted Output • Memory Load and Store • 8080 Input and Output • Multiple Statements Per Line • Renumber • If Then Else • Array Dimensions Limited by Memory • Single Character Input.

Commands: RUN, LIST, SCR, CLEAR, REN, CONT, SAVE, LOAD, VERIFY, FILE, OPEN, CLOSE, REW, POS, DEF.

Statements: LET, IF THEN ELSE, FOR NEXT, GOTO, ON, EXIT, STOP, END, REM, READ, DATA, RESTORE, INPUT, GOSUB, RETURN, PRINT, OUT, POKE, PLOT.

Build in Functions: FREE, ABS, SGN, INT, LEN, CHR\$, VAL, STR\$, ASC, SIN, COS, RND, LOG, TIME, EXP, CALL, SQRT, PEEK, INP.

Chassis

Backplane: 10 S-100 card slots

Disc Drives: 3 mounting slots

Dimensions: 19" W x 17 1/4" D x 7" H (including rack mount ears)

Firmware Debugger

Functions: Tape loader for Byte standard or Polyphase encoded Poly format absolute binary cassette files. Front panel simulator program displays register and memory on system video display. Commands allow register or memory modification, program interrupt and single step of or return to interrupted program. The debugger is completely stack re-entrant.

Disk Drives

Transfer Rate: 125,000 bits/sec

Latency: 100 ms

Access Time: 40 ms track to track

Maximum Number of Drives: 3

Tracks/Disk: 35

Sectors/Track: 10

Data Bytes per Disk: 89,600

MTBF: 8000 hours

Hard Error Rate: less than 1 in 10¹¹ bits read

Video Display

Number of Characters: 1024

Characters per Line: 64

Character Set: 96 ASCII characters; 32 Greek characters and special symbols

Character Font: 7 x 9 dot matrix

Graphics Resolution: 128 horizontal; 48 vertical

Processor Card

Processor Type: 8080A.

Clock: Crystal controlled 1.8432 MHz.

Interrupts: 8 level vectored.

Real Time Clock: 50/60 Hz (referenced to line frequency).

Serial I/O Port: TTL levels for optional minicards (Printer Interface & Cassette Interface available).

Baud Rate: Software controlled 12.5 to 9600 baud (asynchronous) 800 to 57,600 baud (synchronous).

Data Format: 5, 6, 7, or 8 bits with or without parity.

Ports: Can handle up to 2 minicards.

Memory

RAM: 16,896 bytes **ROM:** 3,072 bytes

Access Time: 500 ns

Power Supplies

AC Input: 105-125VAC, 50-60 Hz, 400 W max.

+8V Supply: 15A

+16V Supply: 5A

-16V Supply: 1A

Cabinet

Material: Walnut exterior

Dimensions: 20" W x 17 1/4" D x 8" H (including rubber feet)

The POLY 88 Microcomputer System



If someone offered to sell you a computer to use in your home, you'd probably think he was nuts.

What on earth would you use it for?

Wouldn't you have to move the kids out and give the computer their bedrooms? What bank would give you a thirty year loan so you could afford to supply it with power, programs, and peripheral equipment? And who would operate it for you?

Let us give you some answers—answers that may surprise you. Computers have come a long way in the last few years, and now, with the POLY 88 microcomputer from PolyMorphic Systems, you can have all the advantages of a computer in your own home, today.

What would you use it for?

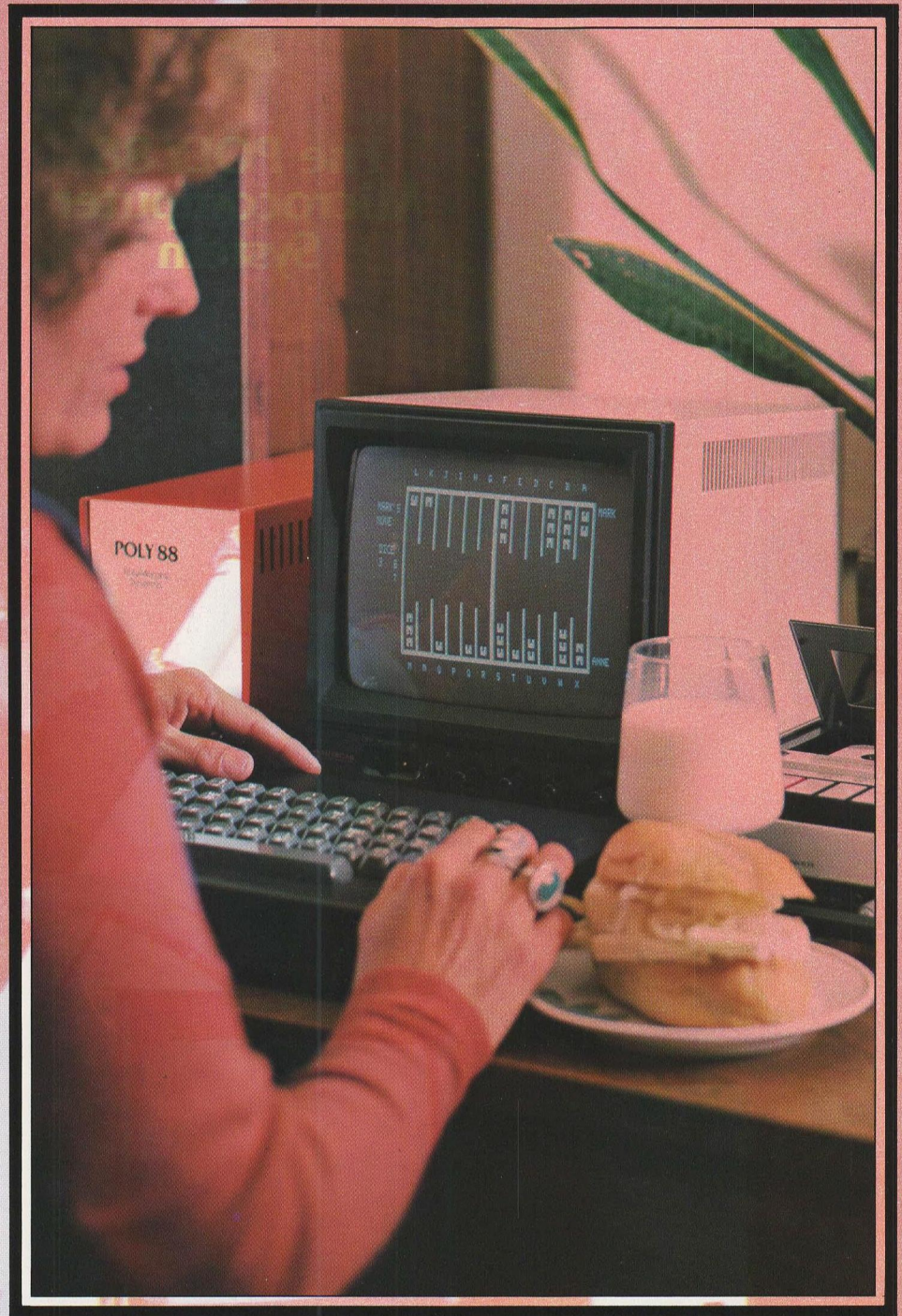
Your entire family can use the POLY 88 to help systemize your household routines: store your appointment calendar, analyze your home energy use, set up a diet program, balance your budget. It introduces children to the world of computers—it can play games with them or help them with their schoolwork.

What about size and operating costs?

The POLY 88 itself and the few components you use to work it fit on your desk top, or on one end of your kitchen table. It runs on standard house current and costs less to operate than your color TV.

But you're just a _____ (teacher, lawyer, truckdriver, housewife, farmer—you fill in the blank). How would you get this system to do anything for *you*? The POLY 88, even with all its abilities and potential, is easily operated by anyone—not just a computer expert. The only "language" you need to know to use it is English. A tape cassette recorder plays pre-recorded programs to the computer (or can record your own programs once you get adventurous enough to begin writing them—and you will). You operate your POLY 88 through a standard typewriter keyboard, and a TV screen presents your results in words and pictures, tables and graphs, in as much detail as you wish.

We designed the POLY 88 for you. Have your local dealer demonstrate the POLY 88 to you and your family, and show you how it can make your life easier, fuller, and more enjoyable. (It costs less than you think.)



Specifications for 11K BASIC by PolyMorphic Systems

Size: 11 K bytes, **Scientific Functions:** Sine, cosine, log, exponential, square root, random number, x to the y power, **Formatted Output, Multi-line Function Definition, String Manipulation and String Functions, Real-Time Clock, Point-Plotting on Video Display, Array Dimensions limited by Memory, Cassette Save, Load and Verify of Named Programs, Multiple Statements per Line, Renummer, Memory Load and Store, 8080 Input and Output, If Then Else, Input Type-Ahead.**
Commands: RUN, LIST, SCR, CLEAR, REN, CON, SAVE, LOAD, VERIFY.

Statements: LET, IF THEN ELSE, FOR NEXT, GOTO, ON, EXIT, STOP, REM, READ, DATA, RESTORE, INPUT, GOSUB, RETURN, PRINT, POKE, OUT.
Built in Functions: FREE, ABS, SGN, INT, LEN, CHR\$, VAL, STR\$, ASC, SIN, COS, RND, LOG, TIME, EXP, SQRT, CALL, PEEK, INP, PLOT.

**PolyMorphic
Systems**

460 Ward Drive Santa Barbara,
CA 93111 (805) 967-0468

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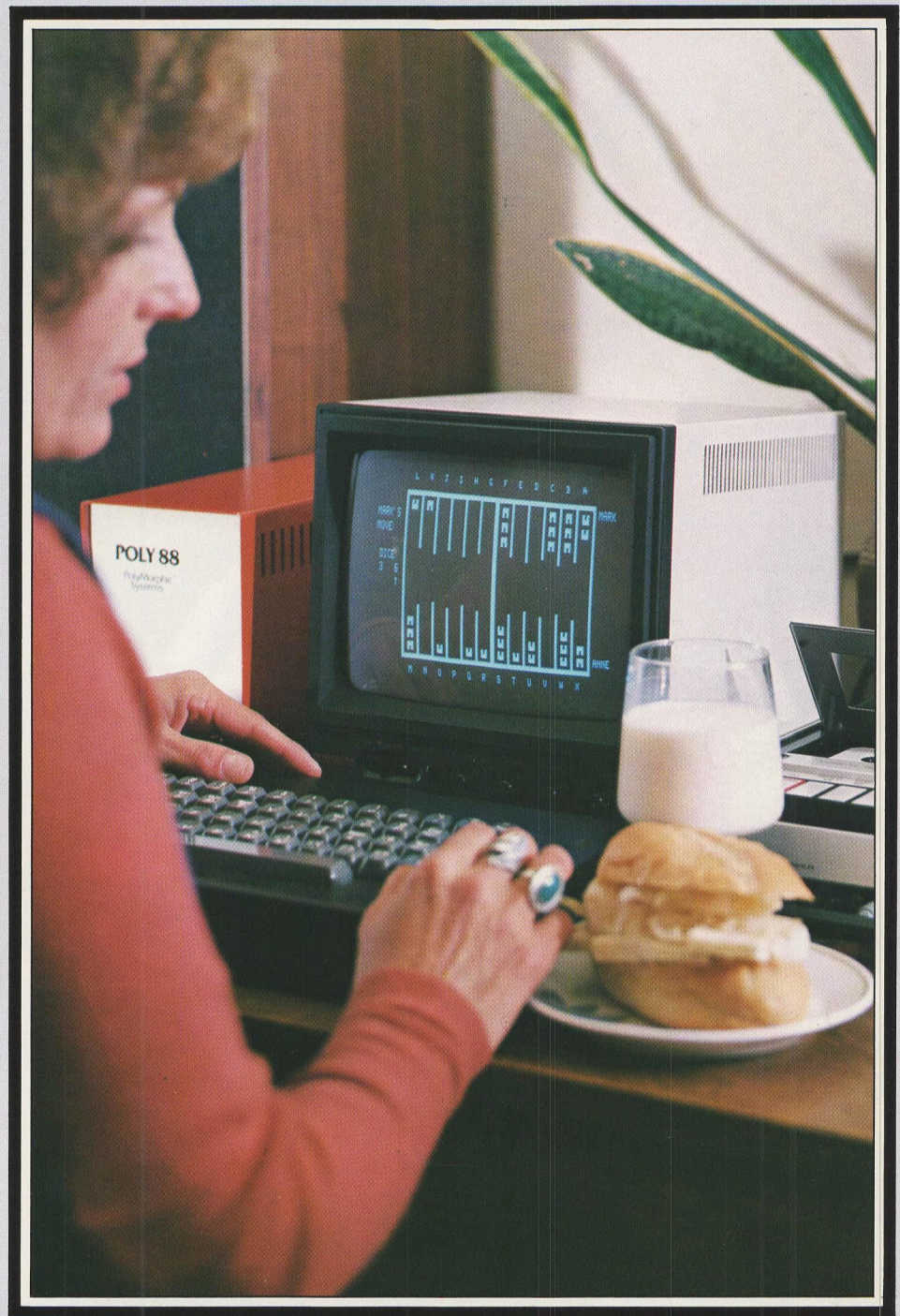
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